

Course Information

Course Location	Meeting Days	Time
Chambers 2198	Monday, Wednesday, & Friday	9:40-10:30am

Instructor Information

Instructor Information	Office Location	Hours
Dr. Jason S. Byers	Main Office Chambers 2256	MW: 3-4pm
jabyers@davidson.edu (704) 894-2760	Data CATS, drop in hours Hurt Hub	TBD

Syllabus

Course Home

Everything you need for this class (announcements, resources, assignments and other activities) will be posted on the course [website](#). Please plan to check the page regularly.

Course Meeting Link

TBD

Course Description

This course is an introduction to statistics as a science of understanding and analyzing data and a powerful tool to unveil bias, discrimination, and inequity. Students will deepen their understanding of social and economic issues on local and global scales through the analysis of real, compelling datasets using R software.

Learning Outcomes

Together, we will strive for your individual and collective success in achieving the learning outcomes of this course. At the conclusion of this course, students will be able to:

- Understand each step of the data lifecycle, identify potential sources of statistical and human bias, and determine their implications on the scope of inference.
- "Think with data" by using statistical software to explore, analyze, visualize, and interpret nontrivial datasets with immediate relevance and importance to your life.
- Critically consume diverse sources of published data to identify, explain, and evaluate instances of inequality between groups; critique data-based claims; and evaluate data-based decisions.
- Identify and evaluate misuses, distortions, and misrepresentations of data and statistics.
- Apply your statistical literacy to work toward a more just society.

Curricular Connections

This course is an introductory course for the Data Science minor and the Applied Mathematics minor; it also satisfies the Justice, Equality, and Community and Mathematical and Quantitative Thought requirements.

Prerequisites

There are no prerequisites for this course. The instructor assumes that students have no previous experience with R, computer programming, or statistics.

Course Materials

To maximize access to this class, we will use freely available textbooks, videos, and other resources, with a focus on the following:

- Primary Text (OJ): Diez, David, Mine Cetinkaya-Rundel, and Christopher D. Barr. 2019. "OpenIntro Statistics." 4th Edition. This book is freely available online.
- Primary Text (HOPR): Golemund, Garrett. 2014. "Hands-On Programming with R: Write Your Own Functions and Simulations." O'Reilly Media. This book is freely available online. It is also available in paperback, if you prefer a hard copy. Warning: some content and the numbering system differs between print and online versions; I will exclusively refer to the free online version.

Reference Texts

- Supplementary Text (R4DS): Wickham, Hadley and Garrett Golemund. 2016. "R for Data Science: Import Tidy, Transform, Visualize, and Model Data." O'Reilly Media. This book is freely available online.
- Supplementary Text (DSB): Cetinkaya-Rundel, Mine. 2021. "Data Science in a Box." This book is freely available online.

Software

This course will use two freely available programs, R and RStudio, in order to complete the assignments for this course. R and RStudio are installed on all Davidson campus computers. They are also freely available to install on your own computer.

Access and Accommodation

The college welcomes requests for accommodations related to disability and will grant those that are determined to be reasonable and maintain the integrity of a program or curriculum. To make such a request or to begin a conversation about a possible request, please contact the Office of Academic Access and Disability Resources, which is located in the Center for Teaching and Learning in the E.H. Little Library: Beth Bleil, Director, bebleil@davidson.edu, 704-894-2129; or Alysén Beaty, Assistant Director, albeaty@davidson.edu, 704-894-2939. It is best to submit accommodation requests within the drop/add period; however, requests can be made at any time in the semester. Please keep in mind that accommodations are not retroactive.

Course Organization

Modes of learning in this class (whether assessed directly or indirectly) require a range of skills and abilities. Every student's success is important to me, and I am happy to work with you to develop strategies for success in this class. For Fall 2021, we will be meeting both in person and remotely, to allow everyone to participate fully in the collaborative environment that is necessary to maximize your learning. Learning R and using it to illuminate and analyze issues of injustice or structural inequality takes regular and repeated practice.

- In-Class Activities.** This course will contain a mixture of short lectures, interspersed with discussions, short demonstrations and presentations. Each class day will involve a significant amount of hands-on work with R and data. In order to learn from these activities, you must do the assigned readings and videos before you come to class, and be prepared to ask (and answer) questions before diving into a small group discussion or activity.
- Labs.** Weekly labs will be conducted every Friday. The labs will provide you with regular practice using statistical methods in R. These assignments will build on the material presented in class, and require you to apply the basic concepts in new ways. All labs can be completed with a partner. All code and work must be the work of you and your partner. You may also search for existing advice on the Internet. You may not ask any other person, whether at Davidson or elsewhere (including the Internet) to help you solve a problem.
- Quizzes.** In general, there will be a total of 5 quizzes spread throughout the semester. Quizzes cover all course material that has been presented between each quiz, with an emphasis on techniques used in the previous lab. Quizzes are to be completed individually, with no help from anyone, in a limited amount of time.
- Exams.** There will be two exams to assess your mastery of the material covered in the course. Both exams will take place during class and will be completed individually.

Attendance Policy

Missing class will adversely affect your grade in many ways. In addition, the college attendance policy will be enforced: missing more than 25% of class meetings makes you eligible for a failing grade. Please look carefully at the syllabus during the first week of class. Should there be a conflict between any class session or assignment due date and a religious holiday or observance, athletic contest, or another academic or personal commitment please let me know well in advance. Religious observance warrants a legitimately excused absence. If you must miss class for any reason, excused or otherwise, you are responsible for getting notes from a classmate and turning in all work on time. Each student will be granted 2 unexcused absences.

Getting Help

It is normal and expected that all students will need help outside of class with the material in this course. Because a topic like statistics and a language like R is only learned with practice, an important source of help is additional exercises, in the required textbook or optional online resources provided on the course web page. The following additional resources are also available.

- Office Hours.** I welcome you to visit me during the hours listed at the beginning of this document. It is a good practice to make an appointment with me even if outside of the listed hours of availability.
- Data Cats.** Data CATS offers free assistance to students working on data-focused assignments and projects. Student consultants are highly qualified to help you debug R code, find datasets, perform analyses, and make visualizations. Data CATS is located in the Hurt Hub.
- Math and Science Center.** The Math & Science Center offers free assistance to students in all areas of math and science, with a focus on the introductory courses. Trained and highly qualified peers hold one-on-one and small-group tutoring sessions on a drop-in basis or by appointment, as well as timely recap sessions ahead of scheduled reviews. Emphasis is placed on thinking critically, understanding concepts, making connections, and communicating effectively, not just getting correct answers. In addition, students can start or join a study group and use the MSC as a group or individual study space. It is located in the Center for Teaching & Learning (CTL) on the first floor of the College Library.
- Honor Code.** Please adhere to the Davidson College Honor Pledge.

Grading

Category	Points
Attendance & Participation	10 Points
Labs	30 Points
Quizzes	20 Points
Exam 1	20 Points
Exam 2	20 Points

Schedule

A tentative class schedule of topics, readings and due dates is available below. Minor adjustments will be made as needed, on the course web page. Please double check the web page before doing each reading assignment.

Week 1

Topics

- Introduction
- Downloading R/RStudio
- Introduction to R and RStudio
- R Markdown

Date Readings

8/23	Introduction
8/25	HOPR Appendix A
8/27	HOPR Chapters 1-3 R4DS Chapter 4 R4DS Chapter 6 R4DS Chapter 27.1-27.5

Week 2

Topics

- Getting and Loading Data
- Dealing with Messy Data
- Understanding Economic Mobility

Date Readings

8/30	HOPR Appendix D R4DS Chapter 11
9/1	HOPR Chapter 7 R4DS Chapter 12.5
9/3	LOTF Executive Summary LOTF Chapter 1 Lab

Week 3

Topics

- Data Visualization

Date Readings

9/6	R4DS Chapter 3.1-3.4 Data Visualization in R
9/8	R4DS Chapter 3.5-3.10
9/10	Lab

Week 4

Topics

- Transforming Data

Date Readings

9/13	R4DS Chapter 5.1-5.4
9/15	R4DS Chapter 5.5-5.7 LOTF Chapter 3
9/17	Lab

Week 5

Topics

- Introduction to Data

Date Readings

9/20	OIS Chapter 1.1-1.2
9/22	OIS Chapter 1.3-1.4
9/24	Lab

Week 6

Topics

- Summarizing Data

Date Readings

9/27	OIS Chapter 2.1
9/29	OIS Chapter 2.3
10/1	NO CLASS (Fall Break)

Week 7

Topics

- Probability

Date Readings

10/4	OIS Chapter 3.1-3.2
10/6	OIS Chapter 3.3-3.5
10/8	OIS Chapter 3.3-3.5

Week 8

Topics

- Exam I

Date Readings

10/11	Exam I Review
10/13	Exam I
10/15	LOTF Chapter 5

Week 9

Topics

- Distributions

Date Readings

10/18	OIS Chapter 4.1-4.3
10/20	OIS Chapter 4.4-4.5
10/22	Lab

Week 10

Topics

- Foundations for Inference

Date Readings

10/25	OIS Chapter 5.1-5.2
10/27	OIS Chapter 5.3
10/29	Lab

Week 11

Topics

- Inference for Categorical Data

Date Readings

11/1	OIS Chapter 6.1-6.2
11/3	OIS Chapter 6.3-6.4
11/5	Lab

Week 12

Topics

- Inference for Numerical Data

Date Readings

11/8	OIS Chapter 7.1-7.3
11/10	OIS Chapter 7.4-7.5
11/12	Lab

Week 13

Topics

- Introduction to Linear Regression

Date Readings

11/15	OIS Chapter 8.1-8.2
11/17	OIS Chapter 8.3-8.4
11/19	Lab

Week 14

Topics

- Multiple and Logistic Regression

Date Readings

11/22	OIS Chapter OIS Chapter 9
11/24	NO CLASS (Thanksgiving)
11/26	NO CLASS (Thanksgiving)

Week 15

Topics

- Exam II

Date Readings

11/29	Exam II Review
12/1	Exam II